



## **Survey of the occurrence of 2,5-Di-tert-butylhydroquinone in food contact materials**

A LOUS 2012-2015 follow-up project

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Danish Ministry of the Environment  
Environmental Protection Agency

# Survey of the occurrence of 2,5-Di-tert- butylhydroquinone in food contact materials

A LOUS 2012-2015 follow-up project

Environmental Project no. 1585, 2014

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Survey of the occurrence of 2,5-Di-tert-butylhydroquinone in food contact materials

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Sources must be acknowledged.

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# Preface

Over the period 2012-2015 the Danish Environmental Protection Agency (Danish EPA) will perform surveys of all 40 substances and substance groups on the List of Undesirable Substances (LOUS) (Danish EPA, 2011) will be surveyed. The surveys include collection of available information on the use and occurrence of the substances, internationally and in Denmark, information on environmental and health effects, on alternatives to the substances, on existing regulation, on monitoring and exposure and information regarding ongoing activities under REACH among others.

The Danish EPA will on the basis of the surveys assess the need for any further regulation, substitution/phase out, classification and labelling, improved waste management, development of new knowledge or increased dissemination of information.

In the initial survey on 2,5 di-tert-butylhydroquinone a possible use of the substance in materials and articles intended to come into contact with food could not be excluded.

The aim of this project is to explore the possible use of 2,5 di-tert-butylhydroquinone in materials and articles intended to come into contact with food and, if so, which types of materials.

The preparation of this report has been supervised by a reference group consisting of:

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Mette Holm, Danish Veterinary and Food Administration

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Tommy Licht Cederberg, National Food Institute, Technical University of Denmark

# Summary and conclusion

In a previous survey of 2,5-di-tert-butylhydroquinone within the LOUS-project, it was reported that the dominant function of the substance is as an "antioxidant" in various materials including paint and lacquers, rubber, cosmetics and other products (Hansen et al., 2013). The aim of the given project was to explore the possible use of the substance in materials and articles intended to come into contact with food.

The strategy for information search in the given project included a broad spectrum of information sources: Scientific literature; patent search; inventory lists from industry organisations and governmental institutions; international and national legislation regarding food contact materials; databases on the use of substances in products in Denmark, the Nordic countries and in Europe, as well as informal contacts to relevant Danish companies.

The search revealed that there is very limited available information on the use of 2,5-di-tert-butylhydroquinone in materials intended for contact with food.

All food contact materials (FCM's) are regulated by the framework EU regulation (EC) No 1935/2004. Moreover, a specific measure exists for materials and articles of plastics intended for food contact (Regulation (EU) No 10/2011). The substance is not on the positive list of this EU regulation for plastic FCM's, and is therefore not legal to use in plastic for food contact in Europe. For other FCM's as e.g. paper and board, adhesives, printings inks, varnishes and coatings, no specific EU regulations are in place.

According to the U.S. FDA regulation, the substance is permitted to be used in glue, paper and cardboard and in some polymers for food contact when following the given restrictions in the US FDA regulation.

The substance appears in the European Printing Inks Association, EuPIA's inventory list of substances used in printing inks for food contact materials as well as in the Swiss regulation for printing inks intended for contact with food. In the Swiss regulation the substance is listed on List B of non-evaluated substances, and when applied, the substance must not migrate into the food according to this national regulation. No information from literature search and from contact to EuPIA was found on actual use of the substance in printing inks for food contact on the European market. Contact to Danish glue industries has confirmed that the substance is not used in the production of glue for food contact in the Danish market.

Searching in literature and patent databases revealed only one reference on potential use of 2,5-di-tert-butylhydroquinone. In a Japanese patent di-tert-butylhydroquinone is mentioned as a possible substance in epoxy resins that may be used for coatings of food containers and water pipes. No information was found on potential migration of residual monomers of 2,5-di-tert-butylhydroquinone in epoxy resins into food or water.

According to the European Council of Producers and Importers of Paint, Printing Inks and Artist Colours (CEPE) the substance is not used in coatings and inks in metal packaging intended for food contact. Moreover, we found no information on a potential use of the given substance in water pipes in Denmark or Europe.

In conclusion no information on actual use of 2,5-di-tert-butylhydroquinone in food contact materials on the Danish market was identified in the given survey.

# Sammenfatning og konklusion

I en tidligere undersøgelse af 2,5-di-tert-butylhydroquinone under LOUS-projektet er det rapporteret at stoffet er en antioxidant, som kan anvendes i forskellige ikke-fødevarekontakt materialer såsom maling, lakker, gummi og kosmetik. Formålet med indeværende projekt er at kortlægge stoffets mulige anvendelse i materialer og genstande bestemt til at komme i kontakt med fødevarer.

Informationssøgningen har omfattet et bredt spektrum af informationskilder: Videnskabelig litteratur, patent databaser, stoflister fra brancheorganisationer og autoriteter, internationale og nationale lovgivninger vedrørende materialer i kontakt med fødevarer, databaser om brugen af stoffer i produkter i Danmark, Nordisk lande og i Europa såvel som kontakter til danske virksomheder og brancheforeninger.

Den gennemførte søgning viser at den tilgængelige viden om anvendelse af 2,5-di-tert-butylhydroquinon i materialer beregnet til kontakt med fødevarer er meget begrænset.

Stoffet er ikke på positivlisten i den gældende EU regulering for materialer og genstande af plast beregnet til kontakt med fødevarer (Forordning (EU) Nr. 10/2011).

Stoffet forekommer på U.S. FDA's liste over indirekte additiver til anvendelse i fødevarekontaktmaterialer. Ifølge U.S. FDA er det tilladt anvendt i lime, pap og papir samt i visse polymerer til fødevarekontakt under angivne betingelser.

Stoffet forekommer på den europæiske trykfarveindustri's liste over anvendte stoffer i trykfarver til fødevarekontaktmaterialer samt i gældende schweizisk lovgivning for trykfarver beregnet til kontakt med fødevarer. I den schweiziske lovgivning for trykfarver indgår stoffet på en liste B over ikke-evaluerede stoffer, hvilket betyder at stoffet, når det anvendes, ikke må migrere (afgives) til fødevarer. Litteratursøgning og kontakt til den europæiske trykfarve industri, EuPIA har ikke givet yderligere oplysninger om konkrete anvendelser af stoffets i trykfarver til fødevarekontaktmaterialer på det europæiske marked. Kontakt til danske limproducenter har oplyst at stoffet ikke bruges i produktion af lime til fødevarekontaktmaterialer på det danske marked.

Søgning i litteratur og patent databaser på stoffets anvendelse i fødevarekontaktmaterialer gav kun en enkelt reference, et japansk patent, hvor mulig anvendelse af stoffet i epoxy polymere i beholdere til fødevarer og vandrør nævnes. Der er ikke fundet oplysninger om, mulig migration af restmonomerer af 2,5-di-tert-butylhydroquinon til fødevarer eller drikkevand fra epoxy resiner.

Kontakt til den europæiske sammenslutning for lakker og trykfarver, CEPE, har angivet at stoffet ikke anvendes i lakker og trykfarver til metal emballage (dåser) til fødevarer.

Der er ikke fundet oplysninger om mulig anvendelse af stoffet i epoxy polymerer i vandrør i Danmark eller Europa.

Der er i det indeværende projekt ikke fundet nogen information om anvendelse af 2,5-di-tert-butylhydroquinon i fødevarekontakt materialer på det danske marked.





# 1. Introduction to the substance

## 1.1 Chemical name, structure and properties

A general survey of 2,5-di-tert-butylhydroquinone has previously been conducted (Hansen et al., 2013). The survey describes the chemistry, manufacture, use and human health aspects of the substance. For an overview of chemical names, structure, properties, manufacture and main application areas of 2,5-di-tert-butylhydroquinone these informations from the general survey are listed below.

2,5-di-tert-butylhydroquinone is a phenol derivative containing 2 phenol groups and 2 alkyl groups each consisting of three methyl groups.

CAS No: 88-58-4

EC No: 201-841-8

Relevant synonyms for 2,5-di-tert-butylhydroquinone includes:

- 1,4-benzenediol, 2,5-bis(1,1-dimethylethyl)-;
- 2,5-Di-tert-butyl-1,4-hydroquinone;
- 2,5-Bis(2-methyl-2-propanyl)-1,4-benzenediol;
- 1,4-Dihydroxy-2,5-di-tert-butylbenzene, and
- DTBHQ.

The substance is a cream or pale brown crystalline solid with the following physico-chemical properties [chemspider 2012; Chemical Book 2012]:

Molecular Formula: C<sub>14</sub>H<sub>22</sub>O<sub>2</sub>

Molecular weight: 222.33

Melting point: 215-219 °C

Boiling point: 321-324.52 °C

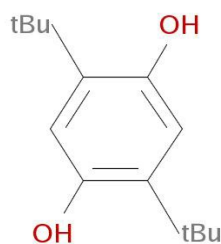
Solubility: Almost insoluble in water

Flash point: 216 °C

Density: 1.07

Stability/storage: Stable. Incompatible with oxidizing agents. Can be stored at room temperature.

In addition to the above information, solubility data of the substance was given in the SciFinder chemical database (see chapter 2) to be 0,21 g/L in water at 25 °C and pH 1-10 (sparingly soluble). This value is generated by chemical modelling software.



**IMAGE 1**

2,5-DI-TERT-BUTYLHYDROQUINONE . CAS NO 88-58-4

The substance is pre-registered under REACH and listed in the ESIS database. In ESIS it is indicated as a low-production-volume chemical.

**TABLE 1**

REGISTERED TONNAGE OF 2,5-DI-TERT-BUTYLHYDROQUINONE

CAS no	EC no	Substance name	Registered under REACH, tonnage band (t/y)*	Danish Product Register, tonnage (t/y)**
<b>88-58-4</b>	201-841-8	2,5-di-tert-butylhydroquinone	Preregistred. Not registered	27.7

The dominant function of the substance is as an "antioxidant" in various materials including paint and lacquers, rubber, cosmetics and other products (Hansen et al., 2013).

## 2. Information search strategy

Initial and preliminary information search in the scientific literature and other published information sources revealed no clear answers concerning the possible use of 2,5-di-tert-butylhydroquinon in materials intended to come into contact with food.

The final search strategy for information of the occurrence of 2,5-di-tert-butylhydroquinon in food contact materials has included a broad spectrum of information sources:

- Scientific literature
- Patent search
- Inventory lists from industry organisations and governmental institutions
- International and national legislation regarding food contact materials
- Databases on the use of substances in products in Denmark, in the Nordic countries and in Europe
- Informal contacts to relevant Danish companies

### 2.1 Scientific literature and patents

The search has been performed in the following databases:

- FindIt: DTU Library's general electronic information search tool. The search includes approx. 170 million references - mainly scientific articles, e-books, conference papers and journals in the technical-scientific and related disciplines.
- Web of Science: Web of Science consists of several databases containing information gathered from scientific journals in all areas of research.
  - Science Citation Index Expanded (1900-present)
  - Social Sciences Citation Index (1956-present)
  - Arts & Humanities Citation Index (1975-present)
  - Conference Proceedings Citation Index - Science (1990-present)
  - Conference Proceedings Citation Index - Social Science and Humanities (1990-present)
- SciFinder: provides access to a wide diversity of research from many scientific disciplines. It includes the Chemical Abstract Service database which is created and maintained by scientists, and have references from over 9,500 currently published journals and patent information from more than 50 active patent issuing authorities. The coverage is chemistry incl. patents, as well as topics like life sciences including biochemistry, biology, pharmacology, medicine, and related disciplines. In addition SciFinder contains the worlds largest collection of organic and inorganic substance information.

## **2.2 International and national legislation regarding food contact materials**

The search strategy has included a search into positive lists of substances in international and national legislations on food contact materials, as e.g the EU positive list *in the EU regulation on plastic food contact materials*. The given regulations are described in chapter 3.

## **2.3 Inventory lists from industry organisations and governmental institutions**

### **Inventory lists by the European Food Safety Authority, EFSA**

EFSA did, in 2010, initiate an EFSA Scientific Cooperation (ESCO) working Group in order to set up inventory lists for substances used for preparation of non-plastic food contact materials. The list is compiled based on information in Member States, Switzerland and Norway and it contains 2800 substances evaluated at a national level. It concerns varnishes and coatings, colorants, wood and cork, paper and paperboard, printing inks, rubbers and silicones (EFSA, 2011).

### **Industry inventory lists and guidelines on food contact materials**

The European Trade Association for printing ink makers, EuPIA, has published guidance documents on packaging inks to their member companies (EuPIA, 2011). In the absence of specific EU legislation for food packaging inks, EuPIA has developed a guideline for selection of raw materials for printing inks intended to be applied on the non-food contact surface of food packaging. As Part of the guideline an inventory list of packaging ink substances used for the non-food contact surface of food contact materials is given and can be found at the internet (EuPIA, 2013).

## **2.4 Databases on the use of substances in products in Denmark, in the Nordic countries and in Europe**

Danish Product Registry: The Product Registry at the Danish Working Environment Authority registers both individual substances and mixtures of substances (preparations). Danish companies have a duty to notify hazardous chemical products for professional use to the Product Registry. The notification duty applies to companies that produce, import or change the trade name of hazardous chemical products in quantities exceeding 100 kg per year.

SPIN - Substances in Preparations In the Nordic countries: It contains information on chemical substances from each of the Nordic product registers. Information available in SPIN: Substances in preparations on the Nordic market; total use – volume in tons; industrial use; use category – product types; exposure potential for primary recipients.

REACH: registration and management of the use of chemical substances throughout Europe. Register individual substances only.

## **2.5 Informal contacts to trade associations and Danish companies**

The European Trade Association for printing inks, EuPIA, as well as the Danish Coatings and Adhesives Association were personally contacted for information on the potential use of 2,5-di-tert-butylhydroquinone in materials intended for food contact. Moreover some Danish producers of printing inks and adhesives for food contact materials were contacted to obtain specific information on the use of the given substance in Danish productions of these materials.

# 3. Regulatory framework

## 3.1 EU regulation of food contact materials

In EU food contact materials (FCM) are regulated by the framework regulation Regulation (EC) No 1935/2004 (EU, 2004). The requirements in regulation no. 1935/2004, covered by article 3, are crucial for ensuring food safety. These general requirements state that FCM shall, under normal and foreseeable conditions of use, not transfer their constituents into foodstuffs in quantities, which could: Endanger human health, bring about an unacceptable change in the composition of the foodstuffs or bring about deterioration in the organoleptic characteristics thereof.

This regulation applies to all FCM, which in their finished state are intended to be brought into contact with food; or already brought into contact with food and are intended for that purpose; or can reasonably be expected to be brought into contact with food or to transfer their constituents to food under normal or foreseeable conditions of use.

In addition to the framework regulation, food contact materials made of plastic are moreover covered by a specific regulation given by EU no 10/2011 and its amendments (EU, 2011). The scope includes plastic coatings and gaskets on metal lids and plastic layers in multi-material multilayer FCMs. The regulation covers a positive list of monomers and other starting substances. These lists include for some substances restrictions on their migration (Specific Migration Limits, SML), the concentration in the FCM (Qm), or their purity or permitted use (e.g. not permitted for plastics in contact with fatty foods). Regulation (EU) no 10/2011 requires that a declaration of compliance (DoC) is supplied for plastic materials and articles at all non-retail stages of the production chain. The information required to be supplied in the DoC is set out in an Annex to the Regulation.

Where a specific measure has not yet been introduced for a given FCM (as e.g. paper and board, adhesives, printings inks, varnishes and coatings) it must comply with the general provisions of the Framework Regulation (EC) no 1935/2004. Compliance with regulation 1935/2004 shall be based on risk assessments of the chemicals used in the composition of the materials, including evaluation of possible migration of the chemicals into food. In addition to the harmonised legislation in Europe, some countries have national legislation in specific areas. Some of these regulations are listed below.

## 3.2 National regulations and recommendations on food contact materials

### Swiss Regulation on printing inks

In Switzerland a regulation for printing inks was issued in 2010 by the Swiss Federal Department of Home Affairs (FDHA). On the basis of the inventory list of substances given by The European Trade Association for printing ink makers (EuPIA) and Council of Europe, the list has been regularly revised and a complete list of substances in use is provided (FDHA, 2011). According to the regulation, packaging inks may only be manufactured from substances listed in the regulation. The lists of substances are divided into a part A and part B. Part A contain evaluated substances, subject to the requirements set out therein, intended to be used in the manufacture of food contact

materials. The substances in part B have not been subjected to any officially recognised scientific testing (such as that of the scientific committee of the EFSA). The use of these substances is permitted if no transfer of these substances to food or food simulants can be detected in a migration test at above 10 microgram per kg food. simulants (FDHA, 2011).

### **German recommendations and regulations on food contact materials**

In addition to EU regulations on food contact materials the German Federal Institute for Risk Assessment, Bundesinstitut für Risikobewertung (BfR) has recommendations on materials and substances for which there is no harmonised EU regulation (BfR, 2013). In the field of plastics these substances are aids to polymerisation as catalysts and initiators, as well as polymerisation production aids like e.g. emulsifiers, which are needed in the manufacturing process. The database moreover includes recommendations for other materials than plastics as e.g. paper and board, silicones and rubber. The BfR Recommendations on Food Contact Materials are not legal norms.

Moreover, a national legislation on printing inks is under preparation in Germany (Nordic Council of Ministers, 2012). The draft regulation will include a positive list of substances which are approved (due to evaluations by EFSA, JECFA and BfR) for use in printing ink formulations for food contact materials. The starting point for this is the Swiss regulation on printing inks. In addition to this, chemicals which have not been risk assessed are listed but are not included in the legislation. The non-regulated substances may be used if the migration is not detectable (detection limit 10 microgram per kg food) and the substances are not classified as either carcinogenic, mutagenic or as a reproduction toxicant (CMR substances). Toxicological risk assessment and an authorization procedure for chemicals used in printing ink will be a part of the proposed activity in Germany.

### **National regulations on printing inks in the Nordic countries**

None of the Nordic countries have additional, national legislation on printing inks and coatings. However, in Denmark, Finland and Norway declaration of compliance, DoC, for all type of FCM including packaging inks, is requested in all links of the production chain.

### **Danish regulation on materials and articles in contact with drinking water**

In Denmark drinking water is regulated by a new regulation on authorisation of materials in contact with drinking water (Ministry of Climate, Energy and Building, 2013a and b). This regulation covers materials, including coatings, in contact with drinking in the permanent installations until the tapping. According to the regulation, the materials must not have health hazardous effect to drinking water. Materials that are not part of the permanent installations for drinking water, i.e. after the tap, are covered by the EU regulations for food contact materials including the Framework regulation no 1935/2004 (EU, 2004) and EU regulation no 10/2011 for materials made of plastic (EU, 2011).

## **3.3 Regulation on Food contact materials by US Food and Drug Administration, FDA**

In US, food contact materials are regulated by the US Food and Drug Administration, FDA, by the regulation Code of Federal Legislation (CFR) 21 on Indirect Food Additive Substances that may come into contact with food as part of packaging or processing equipment (US FDA, 2013). The regulation includes the following lists: 21 CFR 175 Indirect food additives: Adhesives and components of coatings, 21 CFR 176 Indirect food additives: Paper and paperboard components, 21 CFR 177 Indirect food additives: Polymers.



# 4. Occurrence in food contact materials

The presence of 2,5-di-tert-butyl hydroquinone was searched in regulations, recommendations and inventory lists of substances for food contact materials and in literature and patent databases as mentioned in chapter 2. Results of the search are given below.

## 4.1 Occurrence in regulations, recommendations and ESCO list

### **Commission regulation of materials and articles of plastic for food contact (EU) No 10/2011.**

The substance is not on the European Union list of authorised monomers and other starting substances for food contact materials in the regulation of plastic materials and articles intended to come into contact with food (EU, 2011). The substances can therefore not legally be used in food contact materials of plastic on the European market.

### **The German Recommendations**

The substance is not on any of the lists of substances in the database of the German recommendations of Food contact materials (BfR, 2013).

### **Swiss Regulation on printing inks**

In the Swiss national regulation on packaging inks, 2,5 di-tert-butylhydroquinone is listed as an Additive in printing inks under part B (FDHA, 2011). The substance may therefore be used in printing inks or vanishes on food contact materials, however, the substances in part B have not been subjected to any officially recognised scientific testing (such as that of the scientific committee of the EFSA or national bodies).

### **US Food and Drug Administration, FDA**

In US, 2,5 di-t-butylhydroquinone is approved for use as an indirect food additive (Andersen, 1996; US FDA, 2013). The substance is on the following lists of the US Code of Federal Regulations 21, CRF 21, on Indirect Additives, and are permitted to be used in adhesives, paper and board and some polymers for Food Contact according to the given restrictions in the US FDA regulation (US FDA, 2013):

Sec. 175.105 Adhesives in articles for food contact. No restrictions

Part 176.170 Components of paper and board for contact with aqueous and fatty foods. Note: For use only as an antioxidant for fatty based coating adjuvants provided it is used at a level not to exceed 0.005% by weight of coating solids.

Sec. 176.180 Components of paper and paperboard in contact with dry food. No restrictions.

Sec. 176.210 Defoaming agents used in the manufacture of paper and paperboard. No restrictions.

Sec. 177.2260 Filters, resin-bonded. 2,5-Di-tert -butyl hydroquinone for use only in lubricant formulations for rayon fiber finishing and at a usage level not to exceed 0.1 percent by weight of the lubricant formulations.

Sec. 177.2420 Polyester resins, cross-linked. 2,5-Di-tert -butyl hydroquinone used as inhibitor. Total content of inhibitors not to exceed 0.08 percent.

Sec. 177.2800 Textiles and textile fibers. No restriction.

#### **List of EFSA Scientific Cooperation (ESCO)**

The substance is not found on the EFSA Scientific Cooperation (ESCO) member state inventory list of substances for food contact material of non-plastic, including printing inks, coatings, paper and board, rubber and wood for food contact (EFSA, 2011). However another hydroquinone, 2,5-Di-tert-pentylhydroquinone (cas no 79-74-3), is on the lists of substances for coatings and rubber for use as an antioxidant. In coatings this substance is listed to have a specific migration limit: SML(T) of 0.6 mg/kg (as sum of the hydroquinone and derivatives of this substance).

#### **4.2 Industry information on the use of the substance**

2,5-di-tert-butyl hydroquinone is found on the EuPia inventory list of packaging ink substances used for the non-food contact surface of food contact material in the list of “Substances used as Additives or Ingredients of Additive Preparations” (EuPia, 2012). It was not possible to get more information, from personal contact to EuPia, on the actual use of the substance in printing inks for food contact. Therefore it is unknown whether 2,5-di-tert-butyl hydroquinone is used in printing inks for food contact.

According to the Danish Coatings and Adhesives Association the substance is used as an antioxidant in antifouling paints. However, questions to the European Council of Paint and Printing Inks, CEPE, on the use of the substance in food contact materials confirmed that the substance is not used in coatings and inks for metal packaging for food (personal communication to the Danish Coatings and Adhesives Association, 2013). Moreover the substance is not used by Danish producers of adhesives for food contact (personal communication to the Danish Coatings and Adhesives Association, 2013 and from two Danish producers of Adhesives, 2013).

#### **4.3 Registration in databases**

The substance is not registered under REACH due to low production volume, therefore no data is available on the use from this database (Hansen et al., 2013)

In the Danish Product Register of hazardous substances used occupationally (production and importing) in Denmark, the substance is in 2013 registered to be used only in very small amounts as for biocides (0.3 tonne per year) and for paint and lacquers (0.007 tonne per year).

In the database of the Nordic Product Registers, SPIN, the substance was registered to be used for paint, lacquers and varnishes. In Denmark the registered use in 2010 was 2 tonnes for the given applications. However, the database does not contain information on use for food contact materials.

#### **4.4 Information search in literature and databases**

As given in chapter 3, a search was made into the database of Chemical Abstracts. The substance is mentioned in several patents however, findings on the use of 2,5-di-tert-butylhydroquinone in materials and articles for food contact was very limited. Only in one patent, from Japan, di-tert-

butylhydroquinone is mentioned as a possible substance in epoxy resins that may be used for coatings of food containers and water pipes (Shinohara et al., 2003).

# 5. Overall findings and conclusions

## 5.1 Main findings

The substance is not on the positive list in the EU regulation for plastic food contact materials and articles. It can therefore not be used legally in these materials on the Danish market. However it is listed as an additive in the national regulation in Switzerland for printing inks as well as on the inventory industry list of the European Trade Association for printing ink makers, EuPIA. Moreover the substance is in the US FDA regulation on indirect additives for food contact materials in the lists on: Adhesives, components of paper and board and some polymer resins.

From searching in literature and databases it was not possible to find information on any actual use of the substance within food contact material applications, including printings inks.

In one Japanese patent, di-tert-butylhydroquinone is mentioned as a possible substance in epoxy resins that may be used for coatings of food containers and water pipes. No information was found on potential migration of residual monomers of 2,5-di-tert-butylhydroquinone in epoxy resins into food or drinking water.

According to the European Council of Producers and Importers of Paint, Printing Inks and Artist Colours (CEPE) the substance is not used in coatings and inks in metal food containers. Moreover, we found no information on a potential use of the given substance in water pipes in Denmark or Europe.

In conclusion no information on actual use of 2,5-di-tert-butylhydroquinone in food contact materials on the Danish market was identified in the given survey.

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### **Survey of the occurrence of 2,5-Di-tert-butylhydroquinone in food contact materials**

This project is a survey of the occurrence of 2,5-Di-tert-butylhydroquinone (DTBHQ) specifically in food contact material on the Danish market.

The projekt is following up on a previous survey under the Danish EPA's LOUS-review (Environmental Project no. 1477).

This survey clarifies that 2,5-Di-tert-butylhydroquinone is listed for possible use in printing inks food contact materials, but that is not used by European producers and importers. The substance is not allowed for use in plastic materials for food contact. A potential use in water pipes was not confirmed. Overall, the report concludes that there is no information on actual use of 2,5-Di-tert-butylhydroquinone in food contact materials in Denmark.



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